Amendments to the Specification:

Please replace the second paragraph on Page 7, Lines 7-11, with the following amended paragraph:

Another aspect ~~Another object~~ of the invention is to provide a substantially thin tube like heater device that can be easily installed on a typical hot runner nozzle with a reduced overall diameter of the nozzle which allows for a reduction in the spacing between nozzles.

Please replace the third paragraph on Page 7, Lines 13-14, with the following amended paragraph:

A further aspect ~~further object~~ of the invention is to provide a heater that is lower in cost to manufacture and maintain.

Please replace the fourth paragraph on Page 7, Lines 16-18, with the following amended paragraph:

Yet another aspect ~~another object~~ of the invention is to provide a heater that is suitable for mass production quantities through the use of the silk-screening process.

Please replace the fifth paragraph on Page 7, Lines 20-24, with the following amended paragraph:

Another aspect ~~Another object~~ of the invention is to provide a thick-film heater with a unique slip-on and slip-off electrical connector feature that can survive the high temperatures and thermal expansion difficulties inherent in an injection molding machine.

Please replace the sixth paragraph on Page 7, Lines 26-28, with the following amended paragraph:

Yet another aspect ~~another object~~ of the invention is to provide a more reliable heater that also exhibits a more stable and repeatable temperature profile over its usable life.

Please replace the seventh paragraph on Page 7, Lines 30-32, with the following amended paragraph:

Still another aspect ~~another object~~ of the present invention is to provide a heater that can provide an optimized and precise temperature profile along its length.

Please replace the first paragraph on Page 8, Lines 1-3, with the following amended paragraph:

Yet another aspect ~~another object~~ of the present invention is to provide a heater with a multi-layer resistive trace that increases the heater output for a given size heater substrate.

Please replace the second paragraph on Page 8, Lines 5-31, with the following amended paragraph:

The foregoing ~~objects are~~ aspects are achieved by the installation of the present invention in an injection molding machine, particularly on the hot runner nozzle system. These are merely some of the innumerable aspects of the present invention and should not be deemed an all-inclusive listing of the innumerable aspects associated with the present invention. These and other aspects will become apparent to those skilled in the art in light of the following disclosure and accompanying drawings. The present invention includes a cylindrically shaped metal substrate with a silk screened dielectric layer applied thereon. Silk screened or otherwise printed on the dielectric layer is a resistive layer which comprises a predetermined trace pattern with two ends, the pattern of the trace determines the temperature profile along the length of the heater. The resistive trace could comprise multiple layers of resistive material connected serially to increase the heater capacity. Silk screened in communication with the two terminal ends of the resistive trace pattern are electrical contact pads which are designed to interface with a pair of electrical conductors for communication

of an electrical current therethrough. Silk screened over the resistive trace pattern is an insulation layer that protects the resistive layer from abrasion and electrical shorting. The insulation layer could further be formulated to act as a thermal insulator to decrease thermal losses from the outer surface of the heater. The insulation layer is not placed over the electrical contacts. The electrical conductors are placed and rigidly affixed to the electrical contact pads by the use of a removable connector sleeve that slips over the outside diameter of the heater and over the contact pads. There is no welding, brazing or soldering of the conductors to the contact pads. Contact at this interface is maintained by the wedging action and pressure created by the connector sleeve.

Please replace the tenth paragraph on Page 9, Lines 31-32, with the following amended paragraph:

FIG. 8 is a cross sectional view of the locking detent ~~assembly;~~ assembly; and

Please replace the second paragraph on Page 10, Lines 6-31 with the following amended paragraph:

REFERENCE NUMERALS USED IN THE DRAWINGS

8 – hot runner nozzle assembly
10 - preferred embodiment
12 – heater assembly
14 – nozzle body
16 – channel
18 – connector sleeve assembly
20 – nozzle tip
22 – conductor
24 – slot
26 – dielectric layer
28 – resistive layer

30 – locating hole

32 – insulation layer

~~34 – contact pads~~

34 - substrate

35 – detent groove

36 – connector housing

37 – first contact groove

38 – locking detent assembly

39 – second contact groove

40 – contact

42 – key

44 – detent pin

46 – detent spring

48 – low resistance conductive trace

50 – resistive trace

Please replace the first paragraph on Page 11, Lines 1-5, with the following amended paragraph:

52 – contact pads

54 – passageway

55 – wound cable heater temperature profile

~~56 – wound cable heater temperature profile~~

58 – copper sleeve heater temperature profile

60 – optimized computer temperature profile

62 – preferred embodiment temperature profile

Please replace the second paragraph on Page 12, Lines 18-31, with the following amended paragraph:

Referring now to FIGS. 2a, 2b, 2c, and FIG. 3, the heater assembly 12 is shown. The heater assembly 12 comprises an optional slot 24, a locating hole 30, a substrate 34, a thick-film dielectric layer 26, a thick-film resistive layer 28, at least a pair of ~~contact pads 35~~ contact pads 52 and an insulation layer 32. The heater assembly 12 comprises various layers of different materials. The substrate 34 in the preferred embodiment is a C-shaped piece of metal, typically made from steel or other thermally conductive material. The optional slot 24 runs the length of the heater and allows the substrate to act as a self clamping spring when installed around the nozzle body 14. In the preferred embodiment the substrate 34 is made from 430 stainless steel machined from solid bar or tube to have approximately 0.020" to 0.040" thick cylindrical wall.

Please replace the first paragraph on Page 16, Lines 1-8, with the following amended paragraph:

During the formation of the conductive trace 48, at least two ~~contact pads 50~~ contact pads 52 are formed from the same material. The ~~contact pads 50~~ contact pads 52 in the preferred embodiment are located at each end of the resistive layer 28 and provide a place to apply electrical power to the heater assembly 12. The ~~contact pads 50~~ contact pads 52 are located in a predetermined position on the heater assembly 12 for interface with the connector sleeve assembly 18 when the sleeve is fully installed and locked in place.

Please replace the second paragraph on Page 16, Lines 10-17, with the following amended paragraph:

Applied over the resistive layer 28 is the insulation layer 32 also using a silk-screen process. The ~~insulation layer 28~~ insulation layer 32 is not applied over the ~~contact pads 35~~ contact pads 52. The insulation layer 32 is a mechanical, thermal and electrical insulative substance that protects the resistive layer 28 from abrasion and electrical shorts and reduces heat loss from the outside surface of the heater. The insulation layer 32 comprises a glass matrix which is fired at a temperature of approximately 600° C.

Please replace the fourth paragraph on Page 16, Lines 26-32 that continues on Page 17, Lines 1-3, with the following amended paragraph:

The connector housing 36 is an annular shaped plug that will slidably engage the outside diameter of the heater assembly 12. A key 42 on the inside diameter of the housing 36 interfaces with the slot 24 and properly aligns the sleeve assembly 18 with the ~~contact pads 35~~ contact pads 52. The first and second contact grooves 37 and 39 are formed on the inside surface of the connector housing 36 for the insertion of spring contacts 40. The passageways 54 allow for the installation of the conductors 22 through the wall of the housing 36 for connection to the contacts 40.

Please replace the second full paragraph on Page 17, Lines 13-23, with the following amended paragraph:

The electrical spring contacts 40 are used to transmit electrical energy from the conductors 22 to the ~~contact pads 35~~ contact pads 52 on the surface of the heater assembly 12. The spring contacts 40 must be compliant to compensate for the thermal expansion, corrosion resistant and able to withstand a temperature of 425° C continuously without degradation while maintaining a low resistance connection. In the preferred embodiment, the material for the spring contact 40 is made from full hard stainless steel, preferably type 301. The contact surface of the spring contact 40 may be gold plated to improve corrosion resistance and reduce contact resistance.

Please replace the first paragraph on Page 18, Lines 1-21, with the following amended paragraph:

Referring to FIG. 4, FIG. 5 and FIG. 8, the locking detent assembly 38 is shown. The detent assembly 38 is inserted in the detent groove 35. The detent groove 35 runs the length of the housing 36, and is wide enough to fully seat the detent assembly 38. The detent assembly 38 comprises a detent spring 46 and a detent pin 44. When the housing 36 is installed on the heater assembly 12, the detent pin 44 is aligned and communicates with the

locating hole 30. This alignment automatically occurs when the key 42 engages the slot 24 of the heater assembly 12. The detent spring 46 is made from a sheet material that exhibits spring like characteristics that can withstand the high temperatures of the molding process. In the preferred embodiment the detent spring 46 is made from type 301 stainless steel. As the connector sleeve assembly 18 is slid down the heater assembly 12, the detent pin 44 is sized to engage the locating hole 30 and effectively locks the connector sleeve assembly 18 onto the heater assembly 12 in the proper location and insures the alignment and communication of electrical current through the spring contacts 40 and the ~~contact pads 35~~ contact pads 52.

Please replace the fourth paragraph on Page 18, Lines 23-32 that continues on Page 19, Lines 1-11, with the following amended paragraph:

As mentioned previously, the ability to provide an optimized resistive trace 50 based on a computer analysis is a major advantage of this invention. Referring to FIG. 6, a graph is shown that compares the various temperature profiles along the length of the nozzle body based on various heater technologies. A wound cable heater profile 56 shows how hot spots can be generated in the nozzle. This type of heater quickly creates a hot spot in the center portion of the nozzle body and can degrade the quality of the molten material. Also shown is a copper sleeve heater temperature ~~profile 58~~ profile 55. Again, this type of heater, while better than a wound cable heater, still exhibits hot and cold spots that can degrade the quality of the molten material. An optimized computer model trace 60 is shown that shows the best temperature profile for processing molten material in a hot runner nozzle. With the present invention, the resistive trace 50 was designed to approach this optimized performance. Curve 62 shows the actual measured performance of the optimized heater design of the present invention. This temperature profile comes close to the optimized computer model and will result in improved performance of the molding process.